

PLANT AND APHID PARTNERS OF POLEROVIRUSES: ROLE IN VIRUS TRANSMISSION BY APHIDS?

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Poleroviruses are phloem limited viruses strictly transmitted by aphids in a circulative and non propagative manner. Virions are acquired by aphids when ingesting sap from infected plants. Virus particles cross the gut epithelium and the accessory salivary gland cells before being released, together with saliva, into the plant during a subsequent feed. This highly specific transcytosis mechanism relies on the presence of virus receptors on the surface of the aphid cells. We developed several approaches to identify virus partners in the plant and in the aphid to analyse their role in virus transmission by the vector. By screening different aphid cDNA libraries using a yeast two hybrid system, only few candidates were able to bind virus structural proteins. Among them, we found two nuclear proteins (GAR1 and ALY) which may not be the true virus-receptors but could be considered as virus-sensors. An Ephrin receptor-like protein was also found to interact with the viral proteins. Involvement of these candidates in virus transport through the aphid needs to be analyzed by developing in the insect RNAi-based techniques. These experiments are in progress. We also looked for plant virus-partners and identified several phloem proteins able to bind purified virions *in vitro*. We showed that these proteins could stimulate virus transmission by aphids when added together with purified virus to the aphid diet (Bencharki et al. 2010, M.P.M.I., 23: 799). By developing a yeast two hybrid system using a phloem specific cDNA library, we identified five additional proteins able to bind viral proteins. Among them, we found ALY proteins already identified as aphid virus-partners suggesting that orthologous plant and aphid proteins could be implicated in the virus cycle. So far, a direct implication of these proteins in aphid transmission has not been observed and experiments are on going to analyze their functions.